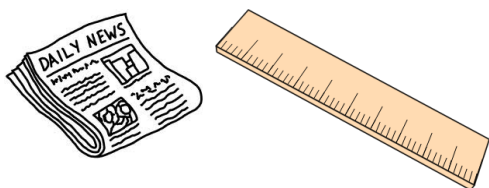


Minds-ON Question & Activity



Question: Why do people's ears pop when they are on a plane?

Activity: Given just one sheet of newspaper, how can you stop a ruler from being karate chopped off the desk



Dec 26-12:48

Do # 1 and 2 on Boyle's Law Problem Sheet
Homework Review:

5

6

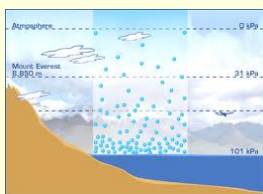
7

Jan 5-11:38

Atmospheric Pressure

The force that a column of air exerts on Earth's surface. The force can be distributed over a large or small area. If the area is big, the pressure is small and vice versa.

At higher altitudes the atmospheric pressure is lower and the density of air particles is lower. **Why?**



As altitude increases, the amount of air above that level becomes smaller and, therefore, exerts a smaller force on the air just below it

Dec 26-12:37

Pressure

So, scientifically, *what* exactly is pressure?

- Pressure = Force / Area
- SI unit = Pa = 1N/m²
- kPa= 1000 Pa
- Pressure of a gas is determined by the kinetic motions of its molecules

Dec 15-12:16 PM

Units of Pressure

Historically mercury barometers were used to measure pressure, so a common unit of pressure is the millimetre of mercury (mmHg). Standard Atmospheric Pressure (SAP), the atmospheric pressure in dry air at a temp. of 0°C at sea level, is 760mmHg. Since atmospheric pressure is a common reference point, the unit atmosphere (atm) is also used. As a tribute to one of the scientists who worked on testing pressure, another unit commonly used is kilopascal (kPa). Standard atmospheric pressure is often expressed as 101.325kPa or 1 atm

$$760 \text{ mm Hg} = 760 \text{ torr} = 1 \text{ atm} = 101.3 \text{ kPa} = 14.7 \text{ psi}$$

A reference table of pressure units is available on page 425 of your textbook.
You don't need to memorise the conversions, just be able to convert one unit to the other if given a problem and a conversion chart

Boyle's Law

Robert Boyle (1627-1691) was a renowned Irish chemist. He was also a physicist, philosopher and inventor.



Boyle was the first prominent scientist to perform controlled experiments and to publish his work with elaborate details concerning procedure, apparatus and observations.

The first use of the term "chemical analysis" is attributed to him.

He is considered to be the first modern chemist, and one of the founders of modern chemistry.

Boyle studied the relationship between pressure and volume of a gas and his observations led to the following law

Boyle's Law

At any constant temperature, the product of the pressure and the volume of any size of a sample of any gas is a constant.

$$P \propto \frac{1}{V} \rightarrow PV = x$$

Another common way of writing Boyle's Law is:

$$P_1 V_1 = P_2 V_2$$

Where, P_1 = initial pressure
 P_2 = final pressure
 V_1 = initial volume
 V_2 = final volume

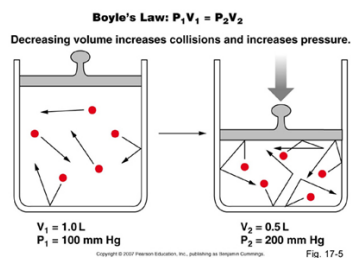
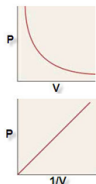
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Boyle's Law

- As pressure on a gas increases, the volume of the gas decreases proportionally, if temperature and amount of gas (moles) remain constant.

$$y = mx + b$$



Dec 15-12:21 PM

Dec 15-12:21 PM

Pressure v Volume: Boyle's Law LAB

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Activity

- Explain the relationship between pressure and volume using Kinetic Molecular Theory (& diagrams and words)
- Complete the Boyle's Law Problem Sheet
- Read Pages 430 - 433 and do # 12, 13, 16, 17

Jan 5-11:46

Dec 26-12:37

Jan 7-20:08